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EXAMINER
SMITH, JOSHUA Y

ART UNIT	PAPER NUMBER
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NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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	Application No.	Applicant(s)
Office Action Summary	10/567,001	HAN ET AL.
	Examiner	Art Unit	
	JOSHUA SMITH	2477	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>03 March 2010</u>.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-40</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-40</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

The amendment filed 03/03/2010 has been entered.

- **Claims 1-40 are pending.**

- **Claims 1-40 stand rejected.**

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   **Claims 29-40** are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter. Claim 29 recites "An article of manufacture for

transmitting packets". The Specification recites in paragraph [0045], "The term "article

of manufacture" as used herein refers to code or logic implemented in hardware logic

(e.g., an integrated circuit chip, Programmable Gate Array (PGA), Application

Specific Integrated Circuit (ASIC), etc.), **computer accessible medium or a computer**

readable medium, such as magnetic storage medium (e.g., hard disk drives, floppy

disks,, tape, **etc.**), optical storage (CD-ROMs, optical disks, etc.), volatile and non-

volatile memory devices (e.g., EEPROMs, ROMs, PROMs, RAMs, DRAMs, SRAMs,

firmware, programmable logic, **etc.**).", and "the article of manufacture in which the code

is implemented may comprise a **transmission media, such as** a **network**

transmission line, wireless transmission media, signals propagating through

space, radio waves, infrared signals, etc.", and "Of course, those skilled in the art will

recognize that many modifications may be made to this configuration without departing

from the scope of the embodiments, and that the article of manufacture may comprise

any information bearing medium known in the art.". This causes Claims 29-40 to be

directed toward a signal, which is non-statutory subject matter.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating
        obviousness or nonobviousness.

5.   **Claims 1-40** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Hassan-Ali et al. (Patent No.: US 7,280,542 B2) in view of Verplanken et al. (Patent

Number: 6,038,592) and Roy et al. (Patent No.: US 6,246,682 B1), hereafter

respectively referred to as Hassan-Ali, Verplanken, and Roy.

6.   **In regard to Claim 1,** Hassan-Ali teaches in column 9, lines 20-25, and in FIG. 4,

reference numeral 402 (FIG. 4) refers to an interface that receives an ingress flow 403

(i.e., the root) (FIG. 4) (receiving a multicast packet) that is to be scheduled for emission

to N egress interfaces 406-1 through 406-N (FIG. 4) (a multicast packet to transmit to destination addresses), where an ingress flow 403 (FIG. 4) is referred to as a root flow and MC (multicast) flows emitted to egress interfaces are referred to as leaf flows, and, in column 2, lines 51-63, where multicasting is supported in an environment, a single source of traffic (i.e., a root) emits cells or packets to a number of destinations (i.e., leaves) (transmit to destination addresses) that receive the replicated traffic (receiving a multicast packet to transmit to destination addresses).

7.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index values, and a pointer location portion 514B (a descriptor) containing pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a descriptor addressing a packet entry in a packet memory including a payload to transmit to destination addresses), where root cells are stored, or written to, cell memory locations (writing a payload of the multicast packet to at least one packet entry in a packet memory) using a root index, starting with the head root cell and additional root flow cells as they are enqueued for a MC (multicast) service (generating a descriptor addressing a packet entry in a packet memory including a payload to transmit to destination addresses, writing a payload of the multicast packet to at least one packet entry in a packet memory).

8.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG. 5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized in the head/tail memory 502 (FIG. 5) (generating headers for destination addresses),

and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating

to the leaf and root flow index values (for a destination address and a descriptor)

(generating headers for destination addresses, and generating, for a destination

address, an indicator including information on a generated header for a destination

address and a descriptor, wherein indicators for destination addresses address

descriptors).

9.   Hassan-Ali fails to explicitly teach generating an indicator including information

on a header for a destination address.

10.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (generating an indicator

including information on a header for a destination address).

11.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations and to aid in more efficient usage of limited memory.

12.   Hassan-Ali fails to teach a plurality of the indicators generated for a plurality of the destination addresses indicate a same descriptor identifying a packet entry to be provided for a plurality of the destination addresses for which the plurality of indicators are generated.

13.   Roy teaches in column 4, line 54 to column 5, line 24, and in FIGS. 1 and 2, each word in a data element is stored in a contiguous space in shared RAM 36a (FIG. 1) so that the entire data element may be accessed via a single address, and at least one pointer is provided for each data element (multiple pointers if the data element is to be multicast), and the pointers are stored as a plurality of link lists in another location of shared RAM, and pointers of different link lists can point to the same data element; i.e., a single data element may be in multiple queues (a plurality of the indicators generated for a plurality of the destination addresses indicate a same descriptor identifying a packet entry to be provided for a plurality of the destination addresses for which the plurality of indicators are generated).

14.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Roy with the teachings of Hassan-Ali in view of Verplanken since Roy provides a method for managing multiple ATM queues in a common memory, which supports multicasting, which makes efficient use of memory, and which is easily implemented (see Roy, column 2, lines 3-37), which can be introduced into the teachings of Hassan-Ali in view of Verplanken to allow efficient

usage of memory when multicasting in an ATM network and ensure reduced memory
management complexity.

15.   **In regard to Claim 2**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG.
5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf
and root flow index values, and a pointer location portion 514B (a descriptor) containing
pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a descriptor is
generated for each packet entry including a payload), where root cells are stored, or
written to, cell memory locations using a root index, starting with the head root cell and
additional root flow cells as they are enqueued for a MC (multicast) service (a descriptor
is generated for each packet entry including a payload).

16.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG.
5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf
flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized
in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an
index portion 514A (FIG. 5) associated with a pointer location portion 514B (a
descriptor) and relating to the leaf and root flow index values (an indicator is generated
for a descriptor and a destination address to which a payload in a packet entry
addressed by a descriptor is transmitted).

17.   Hassan-Ali fails to teach a payload is written to multiple packet entries in a
packet memory.

18.   Verplanken teaches in column 12, lines 37-39, and in FIG. 9, two data buffers

(10) and (11) (FIG. 9) which are stored in a data store represent a message of a user (a

payload is written to multiple packet entries in a packet memory).

19.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

20.   **In regard to Claim 3**, as discussed in the rejection of Claim 1, Hassan-Ali in view

of Verplanken and Roy teaches a destination address, and an indicator for a destination

address, and an indicator corresponding to a descriptor addressing an entry in a packet

memory including payload data for a destination address.

21.   Hassan-Ali fails to teach a next handle in indicators for a destination address to

point to an indicator corresponding to a next entry in a packet memory including further

payload data for a destination address.

22.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (DCB) (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator)

comprises a next buffer address field (a next handle in a an indicator) of 2 bytes, where

this field is used to chain the DCBs, and then their associated data buffers (a next entry

in a packet memory including further payload data for a destination address), in a user queue, where then the chained buffers form a message (a next handle in indicators for a destination address to point to an indicator corresponding to a next entry in a packet memory including further payload data for a destination address).

23.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Verplanken with the invention of Hassan-Ali since Verplanken a method for improving the performance of multicasting by avoiding to execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations and to aid in more efficient usage of limited memory.

24.   **In regard to Claim 4**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index values, and a pointer location portion 514B (a descriptor) containing pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a payload is written to a packet entry in a packet memory), where root cells are stored, or written to, cell memory locations using a root index, starting with the head root cell and additional root flow cells as they are enqueued for a MC (multicast) service (a payload is written to a packet entry in a packet memory, a descriptor is generated for a packet entry including a payload).

25.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG. 5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to the leaf flow index values (a destination address to which a payload in a packet entry addresses by a descriptor is transmitted) (an indicator is generated for a destination address to which a payload in a packet entry addressed by a descriptor is transmitted).

26.   **In regard to Claim 5**, as discussed in the rejection of Claim 1, Hassan-Ali in view of Verplankenm and Roy teaches a generated indicator.

27.   Hassan-Ali fails to teach a handle for each generated indicator addressing an indicator in a queue.

28.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs (direct control blocks) whose duplication fields store the number '0' (an indicator in a queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (addressing an indicator) (a handle for each generated indicator addressing an indicator in a queue).

29.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

30.   **In regard to Claim 6**, as discussed in the rejection of Claim 1, Hassan-Ali in view

of Verplanken and Roy teaches a destination address and an indicator associated with

a destination address, a header for a destination address, payload from an entry in a

packet memory associated with an indicator and a header for a destination address.

31.   Hassan-Ali teaches in column 9, lines 12-16, and in FIG. 1 and FIG. 4, a

multicast (MC) flow arrangement (FIG. 4) where a root flow entering an ATM

environment, e.g., the ATM switch fabric of the access node 100 shown in FIG. 1, is

transmitted to a plurality of egress interfaces using a corresponding number of leaf flows

(transmitting a payload and a header).

32.   Hassan-Ali fails to teach using information on a header for a destination address

in an indicator to access a message.

33.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (using information on a header

for a destination address in an indicator to access a message).

34.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

35.   **In regard to Claim 7**, as discussed in the rejection of Claim 1, Hassan-Ali in view

of Verplanken and Roy teaches a destination address, a header for a destination

address, accessing a header for a destination address from an entry in a packet

memory addressed by a descriptor identified in an indicator for a destination address.

36.   Hassan-Ali teaches in column 9, lines 12-16, and in FIG. 1 and FIG. 4, a

multicast (MC) flow arrangement (FIG. 4) where a root flow entering an ATM

environment, e.g., the ATM switch fabric of the access node 100 shown in FIG. 1, is

transmitted to a plurality of egress interfaces using a corresponding number of leaf flows

(transmitting, for each destination address, a payload from an entry in a packet memory and a accessed header for a destination address).

37.   Hassan-Ali fails to teach using, for each destination address, a message length and offset from an indicator for a destination address to access a header for a destination address from an entry in a packet memory.

38.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9, a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A) (an offset from an indicator) of 1 byte which indicates the beginning of data in that buffer, and a total message count field (FIG. 3A) of 2 bytes which gives a number of bytes used in a message (a message length from an indicator) (using, for each destination address, a message length and offset from an indicator for a destination address to access a header for a destination address from an entry in a packet memory).

39.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Verplanken with the invention of Hassan-Ali since Verplanken a method for improving the performance of multicasting by avoiding to execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations and to aid in more efficient usage of limited memory.

40.   **In regard to Claim 8**, as discussed in the rejection of Claim 1, Hassan-Ali in view

of Verplanken and Roy teaches a generated header and a destination address for which

an indicator is generated.

41.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510

(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index

values, and a pointer location portion 514B containing pointers to a cell memory

locations 516-1 through 516-K (FIG. 5), where root cells (header and payload) are

stored, or written to, cell memory locations (entry in a packet memory) using a root

index, starting with the head root cell and additional root flow cells as they are

enqueued for a MC (multicast) service (writing headers to each entry in a packet

memory including packet payload).

42.   Hassan-Ali fails to teach information on a header for a destination address in an

indicator for a destination address includes a message length and offset used to extract

a message from an entry in a packet memory for a destination address for which an

indicator is generated.

43.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(offset) of 1 byte which indicates the beginning of data in that buffer, and a total

message count field (FIG. 3A) (message length) of 2 bytes which gives a number of

bytes used in a message (message length) (information on a header for a destination

address in an indicator for a destination address includes a message length and offset

used to extract a message from an entry in a packet memory for a destination address

for which an indicator is generated).

44.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

45.   **In regard to Claim 9**, as discussed in the rejection of Claim 1, Hassan-Ali in view

of Verplanken and Roy teaches a payload and an entry in a packet memory addresses

by a descriptor identified in an indicator for a destination address.

46.   Hassan-Ali fails to teach information on a header for a destination address length

and message offset used to extract a message from an entry for a destination address

for which an indicator is generated, and using, for each destination address, a message

length and offset in an indicator for a destination address to access a message for a

destination address from an entry in a packet memory.

47.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an offset from an indicator) of 1 byte which indicates the beginning of data in that

buffer, and a total message count field (FIG. 3A) of 2 bytes which gives a number of

bytes used in a message (a message length from an indicator) (information on a header

for a destination address length and message offset used to extract a message from an

entry for a destination address for which an indicator is generated, and using, for each

destination address, a message length and offset in an indicator for a destination

address to access a message for a destination address from an entry in a packet

memory).

48.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

49.   **In regard to Claim 10**, as discussed in the rejection of Claim 1, Hassan-Ali in

view of Verplanken and Roy teaches an indicator for a destination address.

50.   Hassan-Ali fails to teach writing to a local memory a handle for a destination

address addressing an indicator, queuing indicators corresponding to handles in an

output queue to a packet queue.

51.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-

56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs

(direct control blocks) whose duplication fields store the number '0' from FDQCB

(queuing indicators in an output queue to a packet queue), and associated to direct

control blocks (DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks

(ICB) (14), (15) and (16) (FIG. 5) (handles) which point to the original control block (12)

(FIG. 5) (indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and

(16-1) (FIG. 5) (indicators corresponding to handles) (writing to a local memory a handle

for a destination address addressing an indicator, queuing indicators corresponding to

handles in an output queue to a packet queue).

52.   Hassan-Ali fails to teach writing handles in local memory to an output queue.

53.   Verplanken teaches in column 8, lines 58-60, a next buffer address in an indirect

control block is empty except when an indirect control block (handle) is enqueued in a

FICBQ (queue) (writing handles in local memory to an output queue).

54.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

55.   **In regard to Claim 11**, as discussed in the rejection of Claim 1, Hassan-Ali in

view of Verplanken and Roy teaches a destination packet and an indicator.

56.   Hassan-Ali fails to teach information that indicates an output queue to which a

destination packet generated from an indicator addressed by a handle is queued.

57.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-42 and 50-

56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs

(direct control blocks) whose duplication fields store the number '0' (an indicator in a

queue), and data buffer (10) and (11) (a destination packet) are respectively associated

to direct control blocks (12) and (13) (indicators), and associated to direct control blocks

(DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks (ICB) (14), (15)

and (16) (FIG. 5) (handles) which point to the original control block (12) (FIG. 5)

(indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and (16-1)

(FIG. 5) (writing, to a local memory, information that indicates an output queue to which

a destination packet generated from an indicator addressed by a handle is queued).

58.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

59.   **In regard to Claim 12**, as discussed in the rejections of Claims 1 and 10,

Hassan-Ali in view of Verplanken and Roy teaches writing a payload, generating

headers, generating a descriptor, generating an indicator, writing handles to a local
memory, and writing handles to an output queue, and indicators for a destination
address.

60.   Hassan-Ali teaches in column 4, lines 50-65, and in column 9, lines 12-16, and in
FIG. 1 and FIG. 4, an ATM switch fabric 102 (FIG. 1) (a packet processing block
performs operations), where an overall functionality of the switch fabric 102 includes:
policing; operation, administration and maintenance (OAM); header translation;
queuing; scheduling and traffic shaping; and Connection Admission Control (CAC), and
traffic to the fabric 102 is provided via a number of interfaces (operations), and FIG. 4
depicts an exemplary multicast (MC) flow arrangement where a root flow entering an
ATM environment, e.g., an ATM switch fabric of an access node 100 shown in FIG. 1, is
transmitted to a plurality of egress interfaces (a transmission block) using a
corresponding number of leaf flows (a packet processing block performs operations, a
transmission block).

61.   Hassan-Ali fails to teach handles to access indicators for a destination address to
send a message to a destination address.

62.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-
56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs
(direct control blocks) whose duplication fields store the number '0' (an indicator in a
queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5),
there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point
to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field

represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (addressing an indicator)

(handles to access indicators for a destination address to send a message to a

destination address).

63.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

64.   **In regard to Claim 13**, Hassan-Ali teaches in column 9, lines 20-25, and in FIG.

4, reference numeral 402 (FIG. 4) refers to an interface that receives an ingress flow

403 (i.e., the root) (FIG. 4) (receiving a multicast packet) that is to be scheduled for

emission to N egress interfaces 406-1 through 406-N (FIG. 4) (a multicast packet to

transmit to destination addresses), where an ingress flow 403 (FIG. 4) is referred to as a

root flow and MC (multicast) flows emitted to egress interfaces are referred to as leaf

flows, and, in column 2, lines 51-63, where multicasting is supported in an environment,

a single source of traffic (i.e., a root) emits cells or packets to a number of destinations

(i.e., leaves) (transmit to destination addresses) that receive the replicated traffic

(receive a multicast packet to transmit to destination addresses).

65.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510

(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index

values, and a pointer location portion 514B (a descriptor) containing pointers to a cell

memory locations 516-1 through 516-K (FIG. 5) (a packet memory) (a packet memory,

write a payload of a multicast packet to a packet entry in a packet memory), a descriptor

addressing a packet entry in a packet memory including a payload to transmit to

destination addresses), where root cells are stored, or written to, cell memory locations

(write a payload of the multicast packet to at least one packet entry in a packet memory)

using a root index, starting with the head root cell and additional root flow cells as they

are enqueued for a MC (multicast) service (generate a descriptor addresses a packet

entry in a packet memory including a payload to transmit to destination addresses, write

a payload of the multicast packet to at least one packet entry in a packet memory).

66.   Hassan-Ali teaches in column 4, lines 50-65, and in column 9, lines 12-16, and in

FIG. 1 and FIG. 4, an ATM switch fabric 102 (FIG. 1) (a packet processing block

performs operations), where an overall functionality of the switch fabric 102 includes:

policing; operation, administration and maintenance (OAM); header translation;

queuing; scheduling and traffic shaping; and Connection Admission Control (CAC), and

traffic to the fabric 102 is provided via a number of interfaces (operations), and FIG. 4

depicts an exemplary multicast (MC) flow arrangement where a root flow entering an

ATM environment, e.g., an ATM switch fabric of an access node 100 shown in FIG. 1, is

transmitted to a plurality of egress interfaces using a corresponding number of leaf flows

(circuitry in communication with a packet memory and enabled to perform operations).

67.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG.

5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf

flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized

in the head/tail memory 502 (FIG. 5) (generate headers for destination addresses), and

where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to the

leaf and root flow index values (for a destination address and a descriptor) (generate

headers for destination addresses, and generate, for a destination address, an indicator

including information on a generated header for a destination address and a descriptor,

wherein indicators for destination addresses address descriptors).

68.   Hassan-Ali fails to explicitly teach generate an indicator including information on

a header for a destination address.

69.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (generate an indicator

including information on a header for a destination address).

70.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations and to aid in more efficient usage of limited memory.

71.   Hassan-Ali fails to teach a plurality of the indicators generated for a plurality of the destination addresses indicate a same descriptor identifying a packet entry to be provided for a plurality of the destination addresses for which the plurality of indicators are generated.

72.   Roy teaches in column 4, line 54 to column 5, line 24, and in FIGS. 1 and 2, each word in a data element is stored in a contiguous space in shared RAM 36a (FIG. 1) so that the entire data element may be accessed via a single address, and at least one pointer is provided for each data element (multiple pointers if the data element is to be multicast), and the pointers are stored as a plurality of link lists in another location of shared RAM, and pointers of different link lists can point to the same data element; i.e., a single data element may be in multiple queues (a plurality of the indicators generated for a plurality of the destination addresses indicate a same descriptor identifying a packet entry to be provided for a plurality of the destination addresses for which the plurality of indicators are generated).

73.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Roy with the teachings of Hassan-Ali in view of Verplanken since Roy provides a method for managing multiple ATM queues in a common memory, which supports multicasting, which makes efficient use of memory,

and which is easily implemented (see Roy, column 2, lines 3-37), which can be introduced into the teachings of Hassan-Ali in view of Verplanken to allow efficient usage of memory when multicasting in an ATM network and ensure reduced memory management complexity.

74.   **In regard to Claim 14**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index values, and a pointer location portion 514B (a descriptor) containing pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a descriptor is generated for each packet entry including a payload), where root cells are stored, or written to, cell memory locations using a root index, starting with the head root cell and additional root flow cells as they are enqueued for a MC (multicast) service (a descriptor is generated for each packet entry including a payload).

75.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG. 5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) associated with a pointer location portion 514B (a descriptor) and relating to the leaf and root flow index values (an indicator is generated for a descriptor and a destination address to which a payload in a packet entry addressed by a descriptor is transmitted).

76.   Hassan-Ali fails to teach a payload is written to multiple packet entries in a

packet memory.

77.   Verplanken teaches in column 12, lines 37-39, and in FIG. 9, two data buffers

(10) and (11) (FIG. 9) which are stored in a data store represent a message of a user (a

payload is written to multiple packet entries in a packet memory).

78.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

79.   **In regard to Claim 15**, as discussed in the rejection of Claim 13, Hassan-Ali in

view of Verplanken and Roy teaches a destination address, and an indicator for a

destination address, and an indicator corresponding to a descriptor addressing an entry

in a packet memory including payload data for a destination address.

80.   Hassan-Ali fails to teach a next handle in indicators for a destination address to

point to an indicator corresponding to a next entry in a packet memory including further

payload data for a destination address.

81.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (DCB) (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator)

comprises a next buffer address field (a next handle in a an indicator) of 2 bytes, where

this field is used to chain the DCBs, and then their associated data buffers (a next entry

in a packet memory including further payload data for a destination address), in a user

queue, where then the chained buffers form a message (a next handle in indicators for

a destination address to point to an indicator corresponding to a next entry in a packet

memory including further payload data for a destination address).

82.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

83.   **In regard to Claim 16**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG.

5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf

and root flow index values, and a pointer location portion 514B (a descriptor) containing

pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a payload is written to

a packet entry in a packet memory), where root cells are stored, or written to, cell

memory locations using a root index, starting with the head root cell and additional root

flow cells as they are enqueued for a MC (multicast) service (a payload is written to a

packet entry in a packet memory, a descriptor is generated for a packet entry including a payload).

84.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG. 5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to the leaf flow index values (a destination address to which a payload in a packet entry addresses by a descriptor is transmitted) (an indicator is generated for a destination address to which a payload in a packet entry addressed by a descriptor is transmitted).

85.   **In regard to Claim 17**, as discussed in the rejection of Claim 1, Hassan-Ali in view of Verplankenm teaches a generated indicator.

86.   Hassan-Ali fails to teach a handle for each generated indicator addressing an indicator in a queue.

87.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs (direct control blocks) whose duplication fields store the number '0' (an indicator in a queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field

represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (addressing an indicator) (a

handle for each generated indicator addressing an indicator in a queue).

88.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

89.   **In regard to Claim 18**, as discussed in the rejection of Claim 1, Hassan-Ali in

view of Verplanken and Roy teaches a destination address and an indicator associated

with a destination address, a header for a destination address, payload from an entry in

a packet memory associated with an indicator and a header for a destination address.

90.   Hassan-Ali teaches in column 9, lines 12-16, and in FIG. 1 and FIG. 4, a

multicast (MC) flow arrangement (FIG. 4) where a root flow entering an ATM

environment, e.g., the ATM switch fabric of the access node 100 shown in FIG. 1, is

transmitted to a plurality of egress interfaces using a corresponding number of leaf flows

(transmitting a payload and a header).

91.   Hassan-Ali fails to teach using information on a header for a destination address

in an indicator to access a message.

92.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (using information on a header

for a destination address in an indicator to access a message).

93.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

94.   **In regard to Claim 19**, as discussed in the rejection of Claim 13, Hassan-Ali in

view of Verplanken and Roy teaches a destination address, a header for a destination

address, accessing a header for a destination address from an entry in a packet

memory addressed by a descriptor identified in an indicator for a destination address.

95.   Hassan-Ali teaches in column 9, lines 12-16, and in FIG. 1 and FIG. 4, a

multicast (MC) flow arrangement (FIG. 4) where a root flow entering an ATM

environment, e.g., the ATM switch fabric of the access node 100 shown in FIG. 1, is transmitted to a plurality of egress interfaces using a corresponding number of leaf flows (transmitting, for each destination address, a payload from an entry in a packet memory and a accessed header for a destination address).

96.   Hassan-Ali fails to teach using, for each destination address, a message length and offset from an indicator for a destination address to access a header for a destination address from an entry in a packet memory.

97.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9, a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A) (an offset from an indicator) of 1 byte which indicates the beginning of data in that buffer, and a total message count field (FIG. 3A) of 2 bytes which gives a number of bytes used in a message (a message length from an indicator) (using, for each destination address, a message length and offset from an indicator for a destination address to access a header for a destination address from an entry in a packet memory).

98.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Verplanken with the invention of Hassan-Ali since Verplanken a method for improving the performance of multicasting by avoiding to execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

99.   **In regard to Claim 20**, as discussed in the rejection of Claim 13, Hassan-Ali in

view of Verplanken and Roy teaches a generated header and a destination address for

which an indicator is generated.

100.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510

(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index

values, and a pointer location portion 514B containing pointers to a cell memory

locations 516-1 through 516-K (FIG. 5), where root cells (header and payload) are

stored, or written to, cell memory locations (entry in a packet memory) using a root

index, starting with the head root cell and additional root flow cells as they are

enqueued for a MC (multicast) service (writing headers to each entry in a packet

memory including packet payload).

101.   Hassan-Ali fails to teach information on a header for a destination address in an

indicator for a destination address includes a message length and offset used to extract

a message from an entry in a packet memory for a destination address for which an

indicator is generated.

102.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(offset) of 1 byte which indicates the beginning of data in that buffer, and a total

message count field (FIG. 3A) (message length) of 2 bytes which gives a number of

bytes used in a message (message length) (information on a header for a destination

address in an indicator for a destination address includes a message length and offset

used to extract a message from an entry in a packet memory for a destination address

for which an indicator is generated).

103.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

104.   **In regard to Claim 21**, as discussed in the rejection of Claim 13, Hassan-Ali in

view of Verplanken and Roy teaches a payload and an entry in a packet memory

addresses by a descriptor identified in an indicator for a destination address.

105.   Hassan-Ali fails to teach information on a header for a destination address length

and message offset used to extract a message from an entry for a destination address

for which an indicator is generated, and using, for each destination address, a message

length and offset in an indicator for a destination address to access a message for a

destination address from an entry in a packet memory.

106.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an offset from an indicator) of 1 byte which indicates the beginning of data in that

buffer, and a total message count field (FIG. 3A) of 2 bytes which gives a number of

bytes used in a message (a message length from an indicator) (information on a header

for a destination address length and message offset used to extract a message from an

entry for a destination address for which an indicator is generated, and using, for each

destination address, a message length and offset in an indicator for a destination

address to access a message for a destination address from an entry in a packet

memory).

107.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

108.   **In regard to Claim 22**, as discussed in the rejection of Claim 13, Hassan-Ali in

view of Verplanken and Roy teaches an indicator for a destination address.

109.   Hassan-Ali fails to teach writing to a local memory a handle for a destination address addressing an indicator, queuing indicators corresponding to handles in an output queue to a packet queue.

110.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs (direct control blocks) whose duplication fields store the number '0' from FDQCB (queuing indicators in an output queue to a packet queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (indicators corresponding to handles) (writing to a local memory a handle for a destination address addressing an indicator, queuing indicators corresponding to handles in an output queue to a packet queue).

111.   Hassan-Ali fails to teach writing handles in local memory to an output queue.

112.   Verplanken teaches in column 8, lines 58-60, a next buffer address in an indirect control block is empty except when an indirect control block (handle) is enqueued in a FICBQ (queue) (writing handles in local memory to an output queue).

113.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Verplanken with the invention of Hassan-Ali since Verplanken a method for improving the performance of multicasting by avoiding to execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations
and to aid in more efficient usage of limited memory.

114.   **In regard to Claim 23**, as discussed in the rejection of Claim 1, Hassan-Ali in
view of Verplanken and Roy teaches a destination packet and an indicator.

115.   Hassan-Ali fails to teach information that indicates an output queue to which a
destination packet generated from an indicator addressed by a handle is queued.

116.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-42 and 50-
56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs
(direct control blocks) whose duplication fields store the number '0' (an indicator in a
queue), and data buffer (10) and (11) (a destination packet) are respectively associated
to direct control blocks (12) and (13) (indicators), and associated to direct control blocks
(DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks (ICB) (14), (15)
and (16) (FIG. 5) (handles) which point to the original control block (12) (FIG. 5)
(indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and (16-1)
(FIG. 5) (writing, to a local memory, information that indicates an output queue to which
a destination packet generated from an indicator addressed by a handle is queued).

117.   It would have been obvious to one of ordinary skill in the art at the time of the
invention to combine the invention of Verplanken with the invention of Hassan-Ali since
Verplanken a method for improving the performance of multicasting by avoiding to
execution of useless operations of re-writing and re-deleting the multicast data, and that
also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations and to aid in more efficient usage of limited memory.

118.   **In regard to Claims 24 and 25**, as discussed in the rejections of Claims 13 and 22, Hassan-Ali in view of Verplanken teaches writing a payload, generating headers, generating a descriptor, generating an indicator, writing handles to a local memory, and writing handles to an output queue, and indicators for a destination address.

119.   Hassan-Ali teaches in column 4, lines 50-65, and in column 9, lines 12-16, and in FIG. 1 and FIG. 4, an ATM switch fabric 102 (FIG. 1) (a packet processing block performs operations), where an overall functionality of the switch fabric 102 includes: policing; operation, administration and maintenance (OAM); header translation; queuing; scheduling and traffic shaping; and Connection Admission Control (CAC), and traffic to the fabric 102 is provided via a number of interfaces (operations), and FIG. 4 depicts an exemplary multicast (MC) flow arrangement where a root flow entering an ATM environment, e.g., an ATM switch fabric of an access node 100 shown in FIG. 1, is transmitted to a plurality of egress interfaces (a transmission block) using a corresponding number of leaf flows (a packet processing block performs operations, a transmission block, circuitry comprises packet engines, where one packet engine executes a packet processing block and another packet engine executes a transmission block).

120.   Hassan-Ali fails to teach handles to access indicators for a destination address to send a message to a destination address.

121.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-

56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs

(direct control blocks) whose duplication fields store the number '0' (an indicator in a

queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5),

there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point

to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field

represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (addressing an indicator)

(handles to access indicators for a destination address to send a message to a

destination address).

122.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

123.   **In regard to Claim 26**, Hassan-Ali teaches in column 9, lines 20-25, and in FIG.

4, reference numeral 402 (FIG. 4) refers to an interface that receives an ingress flow

403 (i.e., the root) (FIG. 4) (receiving a multicast packet) that is to be scheduled for

emission to N egress interfaces 406-1 through 406-N (FIG. 4) (a multicast packet to

transmit to destination addresses), where an ingress flow 403 (FIG. 4) is referred to as a

root flow and MC (multicast) flows emitted to egress interfaces are referred to as leaf

flows, and, in column 2, lines 51-63, where multicasting is supported in an environment,

a single source of traffic (i.e., a root) emits cells or packets to a number of destinations

(i.e., leaves) (transmit to destination addresses) that receive the replicated traffic

(receive a multicast packet to transmit to destination addresses).

124.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510

(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index

values, and a pointer location portion 514B (a descriptor) containing pointers to a cell

memory locations 516-1 through 516-K (FIG. 5) (a packet memory) (a packet memory,

write a payload of a multicast packet to a packet entry in a packet memory), a descriptor

addressing a packet entry in a packet memory including a payload to transmit to

destination addresses), where root cells are stored, or written to, cell memory locations

(write a payload of the multicast packet to at least one packet entry in a packet memory)

using a root index, starting with the head root cell and additional root flow cells as they

are enqueued for a MC (multicast) service (generating a descriptor addresses a packet

entry in a packet memory including a payload to transmit to destination addresses, write

a payload of the multicast packet to at least one packet entry in a packet memory).

125.   Hassan-Ali teaches in column 4, lines 50-65, and in column 9, lines 12-16, and in

FIG. 1 and FIG. 4, an ATM switch fabric 102 (FIG. 1) (a switch fabric), where an overall

functionality of the switch fabric 102 includes: policing; operation, administration and

maintenance (OAM); header translation; queuing; scheduling and traffic shaping; and

Connection Admission Control (CAC), and traffic to the fabric 102 is provided via a

number of interfaces (operations), and FIG. 4 depicts an exemplary multicast (MC) flow

arrangement where a root flow entering an ATM environment, e.g., an ATM switch

fabric of an access node 100 shown in FIG. 1, is transmitted to a plurality of egress

interfaces (line cards coupled to a switch fabric) using a corresponding number of leaf

flows (line cards coupled to a switch fabric, circuitry in communication with a packet

memory and enabled to perform operations).

126.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG.

5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf

flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized

in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an

index portion 514A (FIG. 5) relating to the leaf and root flow index values (for a

destination address and a descriptor) (generate, for a destination address, an indicator

including information on a generated header for a destination address and a descriptor,

wherein indicators for destination addresses address descriptors).

127.   Hassan-Ali fails to explicitly teach generate an indicator including information on

a header for a destination address.

128.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (generate an indicator

including information on a header for a destination address).

129.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

130.   Hassan-Ali fails to teach a plurality of the indicators generated for a plurality of

the destination addresses indicate a same descriptor identifying a packet entry to be

provided for a plurality of the destination addresses for which the plurality of indicators

are generated, and each line card includes a network processor.

131.   Roy teaches in column 4, line 54 to column 5, line 24, and in FIGS. 1 and 2, each

word in a data element is stored in a contiguous space in shared RAM 36a (FIG. 1) so

that the entire data element may be accessed via a single address, and at least one

pointer is provided for each data element (multiple pointers if the data element is to be

multicast), and the pointers are stored as a plurality of link lists in another location of

shared RAM, and pointers of different link lists can point to the same data element; i.e.,

a single data element may be in multiple queues (a plurality of the indicators generated

for a plurality of the destination addresses indicate a same descriptor identifying a

packet entry to be provided for a plurality of the destination addresses for which the
plurality of indicators are generated).

132.   Roy teaches in column 4, lines 12-42, and in FIG. 1, an ATM switch interface 12
(FIG. 1) which processes ATM cells entering or leaving an ATM switch, and in an ATM
switch, several of the devices 12 will be coupled to the switch 18 (FIG. 1) and UTOPIA
interfaces will be used to couple the switch to subscriber lines and to the network, and
device 12 has an internal bus 20 (FIG. 1) and three RISC processors 22, 24, 26 (FIG. 1)
which are all coupled to the internal bus 20 (each line card includes a network
processor).

133.   It would have been obvious to one of ordinary skill in the art at the time of the
invention to combine the teachings of Roy with the teachings of Hassan-Ali in view of
Verplanken since Roy provides a method for managing multiple ATM queues in a
common memory, which supports multicasting, which makes efficient use of memory,
and which is easily implemented (see Roy, column 2, lines 3-37), which can be
introduced into the teachings of Hassan-Ali in view of Verplanken to allow efficient
usage of memory when multicasting in an ATM network and ensure reduced memory
management complexity.

134.   **In regard to Claim 27**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG.
5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf
and root flow index values, and a pointer location portion 514B (a descriptor) containing
pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a descriptor is

generated for each packet entry including a payload), where root cells are stored, or written to, cell memory locations using a root index, starting with the head root cell and additional root flow cells as they are enqueued for a MC (multicast) service (a descriptor is generated for each packet entry including a payload).

135.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG. 5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) associated with a pointer location portion 514B (a descriptor) and relating to the leaf and root flow index values (an indicator is generated for a descriptor and a destination address to which a payload in a packet entry addressed by a descriptor is transmitted).

136.   Hassan-Ali fails to teach a payload is written to multiple packet entries in a packet memory.

137.   Verplanken teaches in column 12, lines 37-39, and in FIG. 9, two data buffers (10) and (11) (FIG. 9) which are stored in a data store represent a message of a user (a payload is written to multiple packet entries in a packet memory).

138.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Verplanken with the invention of Hassan-Ali since Verplanken a method for improving the performance of multicasting by avoiding to execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations
and to aid in more efficient usage of limited memory.

139.   **In regard to Claim 28**, as discussed in the rejection of Claim 26, Hassan-Ali in
view of Verplanken and Mamillapalli teaches a generated header and a destination
address for which an indicator is generated.

140.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510
(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index
values, and a pointer location portion 514B containing pointers to a cell memory
locations 516-1 through 516-K (FIG. 5), where root cells (header and payload) are
stored, or written to, cell memory locations (entry in a packet memory) using a root
index, starting with the head root cell and additional root flow cells as they are
enqueued for a MC (multicast) service (writing headers to each entry in a packet
memory including packet payload).

141.   Hassan-Ali fails to teach information on a header for a destination address in an
indicator for a destination address includes a message length and offset used to extract
a message from an entry in a packet memory for a destination address for which an
indicator is generated.

142.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,
a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises
a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)
(offset) of 1 byte which indicates the beginning of data in that buffer, and a total

message count field (FIG. 3A) (message length) of 2 bytes which gives a number of

bytes used in a message (message length) (information on a header for a destination

address in an indicator for a destination address includes a message length and offset

used to extract a message from an entry in a packet memory for a destination address

for which an indicator is generated).

143.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

144.   **In regard to Claim 29**, Hassan-Ali teaches in column 9, lines 20-25, and in FIG.

4, reference numeral 402 (FIG. 4) refers to an interface that receives an ingress flow

403 (i.e., the root) (FIG. 4) (receiving a multicast packet) that is to be scheduled for

emission to N egress interfaces 406-1 through 406-N (FIG. 4) (a multicast packet to

transmit to destination addresses), where an ingress flow 403 (FIG. 4) is referred to as a

root flow and MC (multicast) flows emitted to egress interfaces are referred to as leaf

flows, and, in column 2, lines 51-63, where multicasting is supported in an environment,

a single source of traffic (i.e., a root) emits cells or packets to a number of destinations

(i.e., leaves) (transmit to destination addresses) that receive the replicated traffic

(receiving a multicast packet to transmit to destination addresses).

145.   Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510

(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index

values, and a pointer location portion 514B (a descriptor) containing pointers to a cell

memory locations 516-1 through 516-K (FIG. 5) (a descriptor addressing a packet entry

in a packet memory including a payload to transmit to destination addresses), where

root cells are stored, or written to, cell memory locations (writing a payload of the

multicast packet to at least one packet entry in a packet memory) using a root index,

starting with the head root cell and additional root flow cells as they are enqueued for a

MC (multicast) service (generating a descriptor addresses a packet entry in a packet

memory including a payload to transmit to destination addresses, writing a payload of

the multicast packet to at least one packet entry in a packet memory).

146.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG.

5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf

flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized

in the head/tail memory 502 (FIG. 5) (generating headers for destination addresses),

and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating

to the leaf and root flow index values (for a destination address and a descriptor)

(generating headers for destination addresses, and generating, for a destination

address, an indicator including information on a generated header for a destination

address and a descriptor, wherein indicators for destination addresses address

descriptors).

147.   Hassan-Ali fails to explicitly teach generating an indicator including information

on a header for a destination address.

148.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (generating an indicator

including information on a header for a destination address).

149.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

150.   Hassan-Ali fails to teach a plurality of the indicators generated for a plurality of

the destination addresses indicate a same descriptor identifying a packet entry to be

provided for a plurality of the destination addresses for which the plurality of indicators are generated.

151.   Roy teaches in column 4, line 54 to column 5, line 24, and in FIGS. 1 and 2, each word in a data element is stored in a contiguous space in shared RAM 36a (FIG. 1) so that the entire data element may be accessed via a single address, and at least one pointer is provided for each data element (multiple pointers if the data element is to be multicast), and the pointers are stored as a plurality of link lists in another location of shared RAM, and pointers of different link lists can point to the same data element; i.e., a single data element may be in multiple queues (a plurality of the indicators generated for a plurality of the destination addresses indicate a same descriptor identifying a packet entry to be provided for a plurality of the destination addresses for which the plurality of indicators are generated).

152.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Roy with the teachings of Hassan-Ali in view of Verplanken since Roy provides a method for managing multiple ATM queues in a common memory, which supports multicasting, which makes efficient use of memory, and which is easily implemented (see Roy, column 2, lines 3-37), which can be introduced into the teachings of Hassan-Ali in view of Verplanken to allow efficient usage of memory when multicasting in an ATM network and ensure reduced memory management complexity.

153.   **In regard to Claim 30**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index values, and a pointer location portion 514B (a descriptor) containing pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a descriptor is generated for each packet entry including a payload), where root cells are stored, or written to, cell memory locations using a root index, starting with the head root cell and additional root flow cells as they are enqueued for a MC (multicast) service (a descriptor is generated for each packet entry including a payload).

154.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG. 5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) associated with a pointer location portion 514B (a descriptor) and relating to the leaf and root flow index values (an indicator is generated for a descriptor and a destination address to which a payload in a packet entry addressed by a descriptor is transmitted).

155.   Hassan-Ali fails to teach a payload is written to multiple packet entries in a packet memory.

156.   Verplanken teaches in column 12, lines 37-39, and in FIG. 9, two data buffers (10) and (11) (FIG. 9) which are stored in a data store represent a message of a user (a payload is written to multiple packet entries in a packet memory).

157.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

158.   **In regard to Claim 31,** as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplanken teaches a destination address, and an indicator for a destination

address, and an indicator corresponding to a descriptor addressing an entry in a packet

memory including payload data for a destination address.

159.   Hassan-Ali fails to teach a next handle in indicators for a destination address to

point to an indicator corresponding to a next entry in a packet memory including further

payload data for a destination address.

160.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (DCB) (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator)

comprises a next buffer address field (a next handle in a an indicator) of 2 bytes, where

this field is used to chain the DCBs, and then their associated data buffers (a next entry

in a packet memory including further payload data for a destination address), in a user

queue, where then the chained buffers form a message (a next handle in indicators for

a destination address to point to an indicator corresponding to a next entry in a packet

memory including further payload data for a destination address).

161.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

162.   **In regard to Claim 32**, Hassan-Ali teaches in column 11, lines 44-48, and in FIG.

5, a linked buffer 510 (FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf

and root flow index values, and a pointer location portion 514B (a descriptor) containing

pointers to a cell memory locations 516-1 through 516-K (FIG. 5) (a payload is written to

a packet entry in a packet memory), where root cells are stored, or written to, cell

memory locations using a root index, starting with the head root cell and additional root

flow cells as they are enqueued for a MC (multicast) service (a payload is written to a

packet entry in a packet memory, a descriptor is generated for a packet entry including

a payload).

163.   Hassan-Ali teaches in column 11, lines 25-28 and 44-48, and in FIG. 4 and FIG.

5, leaf index values 410-1 through 410-N (FIG. 5) (an indicator) correspond to the N leaf

flows (destination address) associated with the root flow 403 (FIG. 4) and are initialized

in the head/tail memory 502 (FIG. 5), and where a linked buffer 510 (FIG. 5) includes an

index portion 514A (FIG. 5) relating to the leaf flow index values (a destination address

to which a payload in a packet entry addresses by a descriptor is transmitted) (an

indicator is generated for a destination address to which a payload in a packet entry

addressed by a descriptor is transmitted).

164.   **In regard to Claim 33**, as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplankenm teaches a generated indicator.

165.   Hassan-Ali fails to teach a handle for each generated indicator addressing an

indicator in a queue.

166.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-

56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs

(direct control blocks) whose duplication fields store the number '0' (an indicator in a

queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5),

there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point

to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field

represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (addressing an indicator) (a

handle for each generated indicator addressing an indicator in a queue).

167.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

168.   **In regard to Claim 34**, as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplanken teaches a destination address and an indicator associated with a

destination address, a header for a destination address, payload from an entry in a

packet memory associated with an indicator and a header for a destination address.

169.   Hassan-Ali teaches in column 9, lines 12-16, and in FIG. 1 and FIG. 4, a

multicast (MC) flow arrangement (FIG. 4) where a root flow entering an ATM

environment, e.g., the ATM switch fabric of the access node 100 shown in FIG. 1, is

transmitted to a plurality of egress interfaces using a corresponding number of leaf flows

(transmitting a payload and a header).

170.   Hassan-Ali fails to teach using information on a header for a destination address

in an indicator to access a message.

171.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an indicator including information on a header for a destination address) of 1 byte

which indicates the beginning of data in that buffer, and a total message count field

(FIG. 3A) (an indicator including information on a header for a destination address) of 2

bytes which gives a number of bytes used in a message (using information on a header

for a destination address in an indicator to access a message).

172.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

173.   **In regard to Claim 35**, as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplanken teaches a destination address, a header for a destination address,

accessing a header for a destination address from an entry in a packet memory

addressed by a descriptor identified in an indicator for a destination address.

174.   Hassan-Ali teaches in column 9, lines 12-16, and in FIG. 1 and FIG. 4, a

multicast (MC) flow arrangement (FIG. 4) where a root flow entering an ATM

environment, e.g., the ATM switch fabric of the access node 100 shown in FIG. 1, is

transmitted to a plurality of egress interfaces using a corresponding number of leaf flows

(transmitting, for each destination address, a payload from an entry in a packet memory

and a accessed header for a destination address).

175.   Hassan-Ali fails to teach using, for each destination address, a message length and offset from an indicator for a destination address to access a header for a destination address from an entry in a packet memory.

176.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9, a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A) (an offset from an indicator) of 1 byte which indicates the beginning of data in that buffer, and a total message count field (FIG. 3A) of 2 bytes which gives a number of bytes used in a message (a message length from an indicator) (using, for each destination address, a message length and offset from an indicator for a destination address to access a header for a destination address from an entry in a packet memory).

177.   It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Verplanken with the invention of Hassan-Ali since Verplanken a method for improving the performance of multicasting by avoiding to execution of useless operations of re-writing and re-deleting the multicast data, and that also save the memory space in the data storage, which can be introduced into the multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations and to aid in more efficient usage of limited memory.

178. **In regard to Claim 36**, as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplanken teaches a generated header and a destination address for which an

indicator is generated.

179. Hassan-Ali teaches in column 11, lines 44-48, and in FIG. 5, a linked buffer 510

(FIG. 5) includes an index portion 514A (FIG. 5) relating to a leaf and root flow index

values, and a pointer location portion 514B containing pointers to a cell memory

locations 516-1 through 516-K (FIG. 5), where root cells (header and payload) are

stored, or written to, cell memory locations (entry in a packet memory) using a root

index, starting with the head root cell and additional root flow cells as they are

enqueued for a MC (multicast) service (writing headers to each entry in a packet

memory including packet payload).

180. Hassan-Ali fails to teach information on a header for a destination address in an

indicator for a destination address includes a message length and offset used to extract

a message from an entry in a packet memory for a destination address for which an

indicator is generated.

181. Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(offset) of 1 byte which indicates the beginning of data in that buffer, and a total

message count field (FIG. 3A) (message length) of 2 bytes which gives a number of

bytes used in a message (message length) (information on a header for a destination

address in an indicator for a destination address includes a message length and offset

used to extract a message from an entry in a packet memory for a destination address

for which an indicator is generated).

182.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

183.   **In regard to Claim 37**, as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplanken teaches a payload and an entry in a packet memory addresses by a

descriptor identified in an indicator for a destination address.

184.   Hassan-Ali fails to teach information on a header for a destination address length

and message offset used to extract a message from an entry for a destination address

for which an indicator is generated, and using, for each destination address, a message

length and offset in an indicator for a destination address to access a message for a

destination address from an entry in a packet memory.

185.   Verplanken teaches in column 7, lines 1-8, 20-21 and 33-34, FIG. 3A and FIG. 9,

a direct control block (FIG. 3A, and items 12 and 13 in FIG. 9) (an indicator) comprises

a buffer chaining control block BCCB (FIG. 3A), which contains an offset field (FIG. 3A)

(an offset from an indicator) of 1 byte which indicates the beginning of data in that

buffer, and a total message count field (FIG. 3A) of 2 bytes which gives a number of

bytes used in a message (a message length from an indicator) (information on a header

for a destination address length and message offset used to extract a message from an

entry for a destination address for which an indicator is generated, and using, for each

destination address, a message length and offset in an indicator for a destination

address to access a message for a destination address from an entry in a packet

memory).

186.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

187.   **In regard to Claim 38**, as discussed in the rejection of Claim 129, Hassan-Ali in

view of Verplanken teaches an indicator for a destination address.

188.   Hassan-Ali fails to teach writing to a local memory a handle for a destination

address addressing an indicator, queuing indicators corresponding to handles in an

output queue to a packet queue.

189.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-

56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs

(direct control blocks) whose duplication fields store the number '0' from FDQCB

(queuing indicators in an output queue to a packet queue), and associated to direct

control blocks (DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks

(ICB) (14), (15) and (16) (FIG. 5) (handles) which point to the original control block (12)

(FIG. 5) (indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and

(16-1) (FIG. 5) (indicators corresponding to handles) (writing to a local memory a handle

for a destination address addressing an indicator, queuing indicators corresponding to

handles in an output queue to a packet queue).

190.   Hassan-Ali fails to teach writing handles in local memory to an output queue.

191.   Verplanken teaches in column 8, lines 58-60, a next buffer address in an indirect

control block is empty except when an indirect control block (handle) is enqueued in a

FICBQ (queue) (writing handles in local memory to an output queue).

192.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

193.   **In regard to Claim 39**, as discussed in the rejection of Claim 29, Hassan-Ali in

view of Verplanken teaches a destination packet and an indicator.

194.   Hassan-Ali fails to teach information that indicates an output queue to which a

destination packet generated from an indicator addressed by a handle is queued.

195.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-42 and 50-

56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs

(direct control blocks) whose duplication fields store the number '0' (an indicator in a

queue), and data buffer (10) and (11) (a destination packet) are respectively associated

to direct control blocks (12) and (13) (indicators), and associated to direct control blocks

(DCB) (12) (indicator) and (13) (FIG. 5), there are indirect control blocks (ICB) (14), (15)

and (16) (FIG. 5) (handles) which point to the original control block (12) (FIG. 5)

(indicator) via the MCCB pointer field represented by darts (14-1), (15-1) and (16-1)

(FIG. 5) (writing, to a local memory, information that indicates an output queue to which

a destination packet generated from an indicator addressed by a handle is queued).

196.   It would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the invention of Verplanken with the invention of Hassan-Ali since

Verplanken a method for improving the performance of multicasting by avoiding to

execution of useless operations of re-writing and re-deleting the multicast data, and that

also save the memory space in the data storage, which can be introduced into the

multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations

and to aid in more efficient usage of limited memory.

197.   **In regard to Claim 40**, as discussed in the rejections of Claims 29 and 38,

Hassan-Ali in view of Verplanken teaches writing a payload, generating headers,

generating a descriptor, generating an indicator, writing handles to a local memory, and
writing handles to an output queue, and indicators for a destination address.

198.   Hassan-Ali teaches in column 4, lines 50-65, and in column 9, lines 12-16, and in
FIG. 1 and FIG. 4, an ATM switch fabric 102 (FIG. 1) (a packet processing block
performs operations), where an overall functionality of the switch fabric 102 includes:
policing; operation, administration and maintenance (OAM); header translation;
queuing; scheduling and traffic shaping; and Connection Admission Control (CAC), and
traffic to the fabric 102 is provided via a number of interfaces (operations), and FIG. 4
depicts an exemplary multicast (MC) flow arrangement where a root flow entering an
ATM environment, e.g., an ATM switch fabric of an access node 100 shown in FIG. 1, is
transmitted to a plurality of egress interfaces (a transmission block) using a
corresponding number of leaf flows (a packet processing block performs operations, a
transmission block).

199.   Hassan-Ali fails to teach handles to access indicators for a destination address to
send a message to a destination address.

200.   Verplanken teaches in column 8, lines 3-5, and in column 12, lines 37-39 and 50-
56, and in FIG. 9, a free direct control block queue (FDCBQ) gathers all free DCBs
(direct control blocks) whose duplication fields store the number '0' (an indicator in a
queue), and associated to direct control blocks (DCB) (12) (indicator) and (13) (FIG. 5),
there are indirect control blocks (ICB) (14), (15) and (16) (FIG. 5) (handles) which point
to the original control block (12) (FIG. 5) (indicator) via the MCCB pointer field
represented by darts (14-1), (15-1) and (16-1) (FIG. 5) (addressing an indicator)

(handles to access indicators for a destination address to send a message to a
destination address).

201.   It would have been obvious to one of ordinary skill in the art at the time of the
invention to combine the invention of Verplanken with the invention of Hassan-Ali since
Verplanken a method for improving the performance of multicasting by avoiding to
execution of useless operations of re-writing and re-deleting the multicast data, and that
also save the memory space in the data storage, which can be introduced into the
multicasting system of Hassan-Ali to aid in reducing unnecessary memory operations
and to aid in more efficient usage of limited memory.

Response to Arguments

I. Arguments for Claim Rejection under 35 USC § 103

202.   Applicant's arguments filed 03/03/2010 have been fully considered but they are
not persuasive. The argument that the Examiner has not cited or shown where Hassan
teaches that for each destination address, there is an indicator having information on a
pointer 514B, is not persuasive. A leaf flow in Hassan is directly related to a destination
address, and a leaf index value is of a leaf flow is substantively the same as an
indicator. As presented in the rejections, Verplanken teaches an indicator having
information.

203.   The argument that although the cited Verplanken discusses information
maintained for a message, this does not teach generating an indicator for each
destination address having information on a generated header for the destination

address, is not persuasive. A message contains a header, and Verplanken doesn't

teach that a message doesn't contain overhead or a header, and the ATM cells of

Hassan contain headers.

204.   Applicant's arguments with respect to claims 1, 13, 26 and 29 have been

considered but are moot in view of the new ground(s) of rejection.

Conclusion

205.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

206.   **Zhou et al. (Patent No.: US 6,310,879 B1)**, column 5, lines 23-32, and FIG. 1.

207.   **Hasegawa (Patent No.: US 6,850,522 B2)**, FIGS. 1, 3, 4, 11, and 13, and

relevant text.

        Any inquiry concerning this communication or earlier communications from the

examiner should be directed to JOSHUA SMITH whose telephone number is 571-270-

1826. The examiner can normally be reached on Monday-Friday, 10:30am-7pm, EST.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chirag Shah can be reached on 571-272-3144. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Patent Examiner
06-01-2010

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6-2-2010